

WHAT IS CLAIMED IS:

1. A voice command identifier for a voice-producible system having an internal circuitry, a speaker that outputs an audible sound signal, and a microphone that receives an external sound signal and converts the received sound signal into an electrical signal, the voice command identifier comprising:

a first analog-to-digital converter configured to receive a sound signal and convert the received sound signal into a first digital signal;

an adder configured to receive an electrical signal from the microphone and output an object signal;

a second analog-to-digital converter configured to receive the object signal and convert the received object signal into a second digital signal;

a memory;

first and second digital-to-analog converters configured to convert retrieved data from the memory into analog signals; and

an output selecting switch configured to select one of the analog signals output from the second digital-to-analog converter and the sound signal so as to provide the selected output to the speaker .

2. A voice command identifier as claimed in claim 1, further comprising a microprocessor configured to control operations of the memory, the first analog-to-digital converter, the adder, the first and second digital-to-analog converters, and the output selecting switch.

3. A voice command identifier as claimed in claim 1, wherein the adder is configured to receive the analog signal from the first digital-to-analog converter and subtract the output signal from the electrical signal output from the microphone.

4. A voice command identifier as claimed in claim 1, wherein the memory comprises a plurality of sub-memories which are identifiable from one another, and wherein the sub-memories comprise:
 - a first sub-memory configured to store an environmental coefficient uniquely determined by an environment of the voice-producible system; and
 - a second sub-memory configured to store at least one of the first digital signal and the second digital signal.

5. A voice command identifier claimed in claim 4, wherein the environmental coefficient is acquired by digitizing a signal input into the microphone for a predetermined time period after a pulse of a predetermined amplitude and width output from the speaker.

6. A voice command identifier claimed in claim 4, wherein the object signal is acquired by multiplying the first digital signal with the environment coefficient, accumulating a multiplied result for a predetermined time period, converting the accumulated result into an analog signal and subtracting the analog signal from the electrical signal output from the microphone.

7. A voice command identifying method for a voice-producible system having an internal circuitry, a speaker that outputs an audible sound signal, and a microphone that receives an external sound signal and converts the received sound signal into an electrical signal, the method comprising:

(a) determining whether a setting operation or a normal operation is to be performed;

in case the determination result of (a) shows that the setting operation is to be performed,

(a-1) outputting a pulse of a predetermined amplitude and width;

and

(a-2) acquiring an environmental coefficient, uniquely determined by the operational environment of the voice-producible system, by digitizing a signal input into the microphone for a predetermined time period after the pulse is output.

8. A voice command identifying method as claimed in claim 7, wherein in case the determination result of (a) shows that the normal operation is to be performed, the method further comprises:

(b-1) analog-to-digital converting a signal output from an audio signal generator so as to acquire a digital signal, wherein the audio signal generator generates a sound signal of audio frequency based on a signal received from the internal circuitry;

(b-2) multiplying the digital signal acquired by (b-1) with the environmental coefficient and accumulating a multiplied result; and

(b-3) digital-to-analog converting the accumulated result into an analog signal and generating an object signal by subtracting the analog signal from the electrical signal output from the microphone, wherein the object signal is recognized by a voice recognizer of the voice-producible system.

9. A voice command identifying method as claimed in claim 8, wherein in case the determination result of (a) shows that the setting operation is to be performed, the method further comprises:

(a-3) outputting a sound signal from the audio signal generator through the speaker; and
(a-4) performing (b-1) to (b-3).

10. A voice command identifying method as claimed in claim 8, wherein in case the determination result of (a) shows that the normal operation is to be performed, the method further comprises:

(b-4) controlling the speaker to be muted;
(b-5) determining whether or not a signal is input into the microphone; and
(b-6) in case the determination result of (b-5) shows that no signal is input into the microphone, performing (a-1) and (a-2).

11. A voice command identifying method for a voice-producible system having an internal circuitry, a speaker for outputting an audible sound signal, a microphone for

receiving an external sound signal and converting the received sound signal into an electrical signal, the method comprising:

(a) determining whether a setting operation or a normal operation is to be performed;

in case the determination result of (a) shows that the setting operation is to be performed,

(a-1) initializing all variables;

(a-2) setting a total repetition count P showing a total number of repeated performance of a setting operation, and initializing a variable of current repetition count q, which is indicative of the number of repeated performances of the setting operation;

(a-3) initializing a variable k, which is indicative of the order of a sampled value during a predetermined setting period;

(a-4) generating a sound signal data corresponding to a pulse of a predetermined amplitude and width during the predetermined setting period and outputting the sound signal through the speaker;

(a-5) converting an object signal into a digital signal, wherein the object signal is included in the electrical signal output from the microphone and is recognized;

(a-6) accumulating the value of the digital signal converted in (a-5);

(a-7) determining whether or not the current repetition count q is equal to the total repetition count P, and, if not, performing (a-3) to (a-6) again; and

(a-8) acquiring an environmental coefficient uniquely determined based on an environment of the voice-producible system by dividing the accumulated value by the total repetition count P.

12. A voice command identifying method as claimed in claim 11, wherein in case the determination result of (a) shows that the normal operation is to be performed, the method further comprises:

(b-1) loading the environmental coefficient;

(b-2) receiving volume data from an audio signal generator, and acquiring a weighted environmental coefficient by multiplying the volume data with the environmental coefficient, wherein the audio signal generator is configured to generate a sound signal of audio frequency based on a signal provided from the internal circuitry;

(b-3) converting a sound signal from the audio signal generator into a digital signal during a predetermined sampling period;

(b-4) storing the digital signal converted in (b-3) into a memory by Que operation;

(b-5) acquiring a pseudo-distortion signal $\text{Sum}(\text{Dis})$ using the data stored in the memory and the weighted environmental coefficient according to the following equation:

$$\text{Sum}(\text{Dis}) = \sum_{k=0}^N C'(k)M(k)$$

(b-6) converting the pseudo-distortion signal $\text{Sum}(\text{Dis})$ into an analog signal; and

(b-7) generating the object signal by subtracting the analog pseudo-distortion signal from the electrical signal from the microphone.

13. A voice command identifying method as claimed in claim 12, wherein in case the determination result of (a) shows that the setting operation is to be performed, the method further comprises:
- (a-9) outputting a sound signal due to a random data through the speaker;
 - (a-10) performing (b-1) to (b-7)
 - (a-11) determining whether or not the object signal is substantially zero (0); and
 - (a-12) if the determining result of (a-11) is affirmative, keeping the environmental coefficient as before, and if the determining result of (a-11) is negative, correcting the environmental coefficient and performing (a-9) to (a-11).

14. A voice command identifying method as claimed in claim 12, wherein in case the determination result of (a) shows that the normal operation is to be performed, the method further comprises:
- (b-8) determining whether or not it is the time indicated by a predetermined clocking variable T;
 - (b-9) if the determination result of (b-8) is negative, performing (b-1) to (b-7) repeatedly;
 - (b-10) if the determination result of (b-8) is positive, controlling the speaker not to generate any sound;
 - (b-11) determining whether or not a signal is input into the microphone by detecting the electrical signal from the microphone for a predetermined time period;

(b-12) in case the determination result of (b-11) shows that a signal is input into the microphone, performing (b-1) to (b-7); and

(b-13) in case the determination result of (b-11) shows that no signal is input into the microphone, performing (a-1) and (a-8).

15. A voice command identifier as claimed in claim 1, further comprising an audio signal generator configured to generate the sound signal based on a signal received from the internal circuitry; and

a voice recognizer configured to recognize the object signal included in the electrical signal output from the microphone.